

## Two new species of the *Leptocimbex grahami* group (Hymenoptera: Cimbicidae) from China

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**Abstract:** The *Leptocimbex grahami* group of *Leptocimbex* Semenov, 1896, Cimbicidae is defined and the relationships and characteristics are provided. Two new species in this group are described from Zhejiang and Hubei Provinces in China: *Leptocimbex nigropilosus* Yan & Wei sp. nov. and *L. shennongjiaensis* Yan, Wei & Deng sp. nov. A key to species of this group is also provided.

**Key words:** Tenthredinoidea; sawflies; taxonomy; key

中国细锤角叶蜂属格氏细锤角叶蜂 *Leptocimbex grahami* 种团二新种（膜翅目：锤角叶蜂科）

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**摘要:** 记述采自中国浙江天目山与湖北神农架的细锤角叶蜂属格氏细锤角叶蜂种团 *Leptocimbex grahami* group 2 新种: 黑毛细锤角叶蜂 *L. nigropilosus* Yan & Wei sp. nov. 和神农架细锤角叶蜂 *L. shennongjiaensis* Yan, Wei & Deng sp. nov.; 总结了格氏细锤角叶蜂种团各已知种的特征及关系, 并提供了分种检索表。

**关键词:** 叶蜂总科; 叶蜂; 分类; 检索表

### Introduction

The genus *Leptocimbex* was first described by Semenov (1896). Malaise (1939) revised the genus 78 years ago and recorded 17 species and 3 varieties. *Leptocimbex* Semenov, the second largest genus in Cimbicidae, is endemic to the East Asia region. 32 species have been described worldwide up to the end of 2019 (Saini & Thind 1992; Wei & Nie 1998; Wei & Deng 1999, 2002; Wei & Niu 2008; Taeger *et al.* 2010; Yan & Wei 2013, 2016; Yan *et al.* 2014, 2018).

The *Leptocimbex grahami* group is a small-sized group of the genus *Leptocimbex*,

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including two species occurring all over the world which are *L. grahami* Malaise, 1939 and *L. constricta* Wei & Nie, 1998. In this work, two new species in the *Leptocimbex grahami* group of Cimbicidae are described from Hunan and Hubei Provinces in China, namely, *L. nigropilosus* Yan & Wei sp. nov. and *L. shennongjiaensis* Yan, Wei & Deng sp. nov.

## Material and methods

Specimens were examined with a Leica S8APO dissection microscope. Adult images were taken with a Nikon D700 digital camera and a series of images edited using Helicon Focus (HeliconSoft), while detailed images were taken with Leica Z16 APO/DFC550. The specimens were sufficiently relaxed in a moist chamber before dissection. Dissected ovipositor valves, gonoforcep and penis valves were permanently mounted on slides in gum Arabic and images produced and composited automatically with a Nikon Ci-L/DS-Fi3. Adobe Photoshop CS 6.0 was used for further image processing. The terminology of sawfly genitalia follows Ross (1945), and that of general morphology follows Viitasaari (2002). For a few terms (e.g. middle fovea and lateral fovea), we follow Takeuchi (1952).

Abbreviations used are: OOL — distance between the eye and outer edge of lateral ocelli; POL — distance between the mesal edges of the lateral ocelli; OCL — distance between a lateral ocellus and the occipital carina or hind margin of the head.

The holotype and all paratypes of these new species are deposited in the Insect Collection of Central South University of Forestry and Technology, Changsha, Hunan, China (CSCS).

## Taxonomy

### The *Leptocimbex grahami* group

**Diagnosis.** Dorsum of head yellowish brown, with distinctly black maculae; or at least posterior orbital with pale spot extending upward to posterior margin of temple. Dorsum of head finely and weakly microsculptured and punctured, with oily luster; supra-antennal toruli strongly elevated posterior part strongly caved in or cut off, not gently confluent with frontal ridges; middle and lateral fovea deep, lateral margins of abdominal tergum 1 with carina incomplete, obtusely or absent at posterior 3/5–3/4; abdominal tergum 2 black, terga 3–8 yellowish brown; mesepisternum oblique at middle, transversal carina distinct.

### Key to species of *L. grahami* group

1. Dorsum of head brownish, with distinct maculae, at least upper part of hind orbit and ocellar area largely or on both sides pale; antennomeres 6–7 clearly segmented..... 2
- . Dorsum of head yellowish brown, with black macula at ocellar area; antennomeres 6–7 not clearly segmented..... 3
2. Head and thorax with very short silver hairs, only black and sparse hairs on both sides of labrum and clypeus; labrum of male with middle carina distinct; abdominal tergum 1 with middle carina largely strongly elevated, vertex sharp, apex absent; postocellar area as long as broad, lateral furrow clear, divergent weakly backwards; abdominal terga 3–8 with black maculae distinct medially. Shaanxi; Henan; Hunan; Sichuan; Guizhou ..... *L. grahami* Malaise
- . Head and thorax with black long hairs; labrum of male without distinct middle carina; abdominal tergum 1

- with middle carina feebly elevated, vertex obtuse; postocellar area slightly longer than broad, lateral furrow distinct, divergent backwards; abdominal terga 3–8 with narrow black band at basal margins, without black macula medially..... *L. nigropilosus* Yan & Wei sp. nov.
3. Anal cell of fore wing with long crossveins; abdominal tergum 1 with middle carina strongly elevated, extending to posterior 3/4, cut-off at apex; metascutellum sharply convex, thorn-like at middle; abdominal terga 2–3 black, terga 4–8 yellowish brown, without black macula at middle; mesepisternum with dense punctures below the transversal carina, with weak microsculptures. Hubei.....  
..... *L. shennongjiaensis* Yan, Wei & Deng sp. nov.
- . Anal cell of fore wing without crossveins, with punctiform contracted petiole; abdominal tergum 1 with middle carina extending to posterior margin of notum; metascutellum triangularly obtusely protruding; abdominal tergum 2 black, terga 3–8 yellowish brown, with distinct black macula medially; mesepisternum with transversal carina weak, with coarse microsculptures. Zhejiang..... *L. constricta* Wei & Nie

### 1. *Leptocimbex nigropilosus* Yan & Wei sp. nov. (Fig. 1)

Body length 16 mm (Fig. 1A), head and abdomen yellowish brown, thorax black. Labrum and clypeus bright yellow (Fig. 1D), apical 1/4 of mandible reddish brown; following parts black: frons, inner sides of eyes, longitudinal macula on postocellar area, triangular macula on upper lateral side of eyes (Fig. 1C); antennal flagellum yellowish brown; posterior of pronotum largely and upper lateral lobe yellowish brown, mesoscutellum, posterior of metascutellum pale yellowish brown (Fig. 1B); tegula yellow; basal 1/3 of abdominal tergum 1 black, remaining parts lemon yellow; abdominal tergum 2 all black except yellow macula at middle and posterior margin (Fig. 1B); basal margin of abdominal terga 3–8 with narrow black band, evenly tapering toward apex; abdominal terga 5–8 with black macula at middle and posterior margin; sternum of abdomen blackish brown. Fore wing dark smoky, except entire cells 2cu, 3cu, 2M, 3M and low part of cells 2Rs and R3 yellowish brown and hyaline, hind wing pale yellowish brown; veins C, Sc+R, R1, M+cu of fore wing and vein C of hind wing dark yellow brown, other veins pale yellowish brown (Fig. 1A). Legs black, apical 1/2 of fore femora, apical margin of middle femora, fore and middle tibia all yellow brown; hind tibia black brown; all tarsi bright yellow. Body hairs black.

Labrum and clypeus smooth, shiny (Fig. 1D); dorsum of head finely microsculptured, impunctate, ocellar area with metallic luster, shiny; thorax distinctly punctured; mesoscutellum with large punctures at middle, interspaces distinct smaller than diameters of punctures, feebly shiny. Mesopleuron sparsely and finely punctured with weak microsculptures, and with aeruginous metallic luster (Fig. 1E); metapleuron punctured, interspaces broad and smooth, feebly shiny; abdominal tergum 1 not distinctly punctured, shiny, other terga impunctate, with weak microsculptures, dim.

Labrum slightly concave in middle, lateral margins slightly oblique, anterior margins broadly arcuate (Fig. 1D); anterior margins of clypeus broad and shallow, downward depressed, basal margins straight, lateral margins obliquely truncate toward both sides, epistomal sulcus absent; malar space about 0.5 times length of labrum; inner margins of eyes slightly divergent backwards; supra-antennal toruli strongly elevated with posterior end abruptly cut-off and not evenly connected with frontal carina (Fig. 1D); frontal carina weakly and shallowly elevated, frontal area shuttle-shape, flat; middle foveae broad and deep, roundish; lateral foveae deep and narrow; POL : OOL : OCL = 7 : 16 : 26 (Fig. 1C); postocellar area slightly elevated, about 1.5 times longer than broad, lateral furrow curved

backwards, slightly convergent in middle; post orbit developed; long hairs on head about 3 times as long as the diameter of lateral ocellus (Fig. 1C). Antenna with 7 antennomeres, about as long as head and thorax combined; antennomere 3 about 1.4 times as long as antennomeres 4 and 5 combined, 1.2 times as long as antennomeres 6 and 7 combined; antennomere 7 distinctly constricted in middle, widest breadth of antennomere 7 about 3 times basal breadth of antennomere 3 (Fig. 1G). Mesoscutellum weakly elevated at vertex (Fig. 1B), with median furrow absent, with long hairs about as long as 1/2 breadth of scutellum; metascutellum sharply protruding. Cenchrus oval, distance between inner margin of cenchri about 3.5 times breadth of a cenchrus; mesepisternum with transverse carina distinct at lower margins, with hairs sparse and long (Fig. 1B). Mesepisternum oblique at middle, transversal carina distinct (Fig. 1E). Abdominal tergum 1 with middle carina feebly elevated, vertex obtuse, apex absent; with lateral carina incomplete, extending to posterior margin 3/4 (Fig. 1B). Hind margin of each sternite with wide incision and arcuate in middle, deepening and broadening toward apical margin (Fig. 1F). Middle and hind coxae with one small denticle; inner apical spur of hind tibia about 0.4 times length of hind basitarsomere, outer apical spur about 1/2 length of hind basitarsomere, hind basitarsomere slightly shorter than tarsomeres 2 and 3 combined (20 : 23). Claw simple. Anterior margin of fore wing with smoky brown band; anal cell with clear crossveins. Long hairs on head dense and long at both sides of labrum, clypeus, antennal socket and occipital carina, about as long as 4.5 times the diameter of lateral ocellus; thorax with sparse and long hairs; hairs on abdominal terga clearly uneven, abdominal tergum 1 with clear and long hairs at both sides, other abdominal terga and sternites with short and sparse hairs; subgenital plate with long and straight hairs. Male genitalia as in Figures 1H, 1I. Penis valves with parietal lobe tubercle (Fig. 1K); ventral sulcus distinct; anterior of lobe with spines. Gonocones as shown in Fig. 1J.

Female. Unknown.

**Holotype.** ♂, **China**, Zhejiang Province, Lin'an City, Mt. Xitianmu, E 119.433°, N 30.343°, alt. 1506 m, 28-IV-2017, Zejian LI & Mengmeng LIU leg (LSAF17054). **Paratypes.** 4♂, **China**, Zhejiang Province, Lin'an City, Mt. Xitianmu, E 119.433°, N 30.343°, alt. 1506 m, 13-IV-2017, Kaiwen GAO & Tingting JI leg (LSAF17066).

Variation. Body length 14–20 mm in male; club of antennae color brown to pale yellowish brown; abdominal tergum 2 color all black or yellow macula increasing gradually at middle and posterior margin; abdominal terga 3–8 color pale yellowish brown to brownish black.

Etymology. The specific epithet is composed of the Latin terms “*nigro*” and “*pilosus*”, referring to the black body hairs.

Remarks. This new species is similar to *L. grahami* Malaise, 1939. See the above key for the differences between the two species.

## 2. *Leptocimbex shennongjiaensis* Yan, Wei & Deng sp. nov. (Fig. 2)

Body length 18 mm (Fig. 2A). Body mainly yellowish brown; labrum, clypeus (Fig. 2E), apical 2/3 of abdominal tergum 1 lemon-yellow (Fig. 2D); middle and lateral foveae, ocellar area (Fig. 2C), basal 1/3 abdominal tergum 1 and vertex of middle carina, entire abdominal tergum 2, abdominal tergum 3 largely except for irregular and yellowish brown macula at both sides, abdominal terga 4–6 and abdominal tergum 8 with narrow band at base black (Fig. 2A);

thorax largely black, pronotum pale yellowish brown, V-shaped macula along the notaui on middle lobe of mesonotum dark brown (Fig. 2A); lower part of mesopleuron largely dark red (Fig. 2B); lateral carina of tegula and mesoscutellum reddish brown; mesoscutellum pale brown (Fig. 2D). Wings pale yellowish hyaline, anterior margin of fore wing with band from base (except for anal area) to corner reddish brown; veins yellowish brown, cell Rs, M and vein Cu1a black at outer side of stigma of fore wing, hind wing with cell Rs and M black at apical 1/3 (Fig. 2A). Legs largely yellowish brown, fore coxae, trochanters and femora with black maculae at outer side and base; apical 2/5 of femora and basal 1/4 of tibia yellow; inner side of middle coxae dark vermillion, trochanters and basal 1/2 of femora largely black, apical 1/2 of femora partially and basal 1/4 of tibiae yellow; fore coxae, trochanters and femora black, basal 1/4 of tibiae brown black. Body with dense silver white short hairs, hairs on upper part of supraclypeal area, margins of labrum and base of mandible spare, black and long; between antennal toruli and antennomere 1 with long black hairs; hairs on posterior half of scutellum dense, black or white; inner side of coxae of legs with spare, black and long hairs; hairs on posterior of abdominal terga 7–9 long and black; hairs on cerci silver and long; hairs on margins of sheath dense, long and black.

Body densely and minutely punctured, feebly shiny. Lower part of antennal toruli shiny (Fig. 2E); Mesonotum roughly and distinctly punctured, weakly light-reflecting; scutellum roughly and shallowly punctured, light-reflecting; metascutellum roughly punctured at both sides; abdominal tergum 1 with sparse and fine punctures, largely smooth, with oily luster (Fig. 2D); abdominal tergum 2 distinctly and densely punctured in middle, without punctures at both sides largely; abdominal tergum 3 with distinct punctures.

Anterior margins of clypeus with depressions, wide and shallow, almost straight at margins; labrum flat, lateral margin slightly oblique, anterior margin roundly triangular; malar space about 2 times length of antennomere 1; inner margins of eyes parallel; supra antennal toruli distinct, sharp (Fig. 2E); frontal area oval, deeply concave, lower part as deep as broad; frontal carina straight, underdeveloped, contacting supra antennal toruli; postocellar furrow distinct; postocellar area longer than broad, with breadth about 2/3 length, without middle furrow, lateral furrow distinct, divergent backwards (Fig. 2C). Antenna slender, clubbed indistinct, widest breadth about 2.5 times basal breadth of antennomere 3. Mesonotum with median scutal groove and lateral furrow distinct; mesopleuron slightly rugose, lower margins with transverse carina distinct (Fig. 2B); anterior margins of mesoscutellum truncate, posterior margins sub-triangular; metascutellum slightly elevated backwards, distinctly pointed upwards (Fig. 2D). Fore wing with crossvein distinct. Abdominal tergum 1 with clear lateral carina at basal 1/2; and with middle carina developed, sharp, and absent at basal 1/3, arcuate in lateral view; posterior margins of sternites with depressions shallow and triangular; sheath in lateral views shown in Figure 2F; lancet and middle serrulae shown in Figs. 2G, 2H.

Male. Unknown.

**Holotype.** ♀, **China**, Hubei Province, Shennongjia, alt. 1700 m, 15-VIII-1983, Gentao JIN & Zuyao LIU leg.

**Etymology.** The specific epithet of this new species refers to the collection locality, Shennongjia.

**Remarks.** This new species is similar to *L. constricta* Wei & Nie, 1998. See the above key for the differences between the two species.



Figure 1. *Leptocimbex nigropilosus* Yan & Wei sp. nov. A. Adult male (holotype), dorsal view; B. Metanotum and base of abdomen; C. Head of male, dorsal view; D. Head of male, frontal view; E. Mesopleuron of male, lateral view; F. Abdomen, lateral view; G. Antenna of male; H. Male genitalia, ventral view; I. Male genitalia, dorsal view; J. Gonoferceps; K. Penis valve.

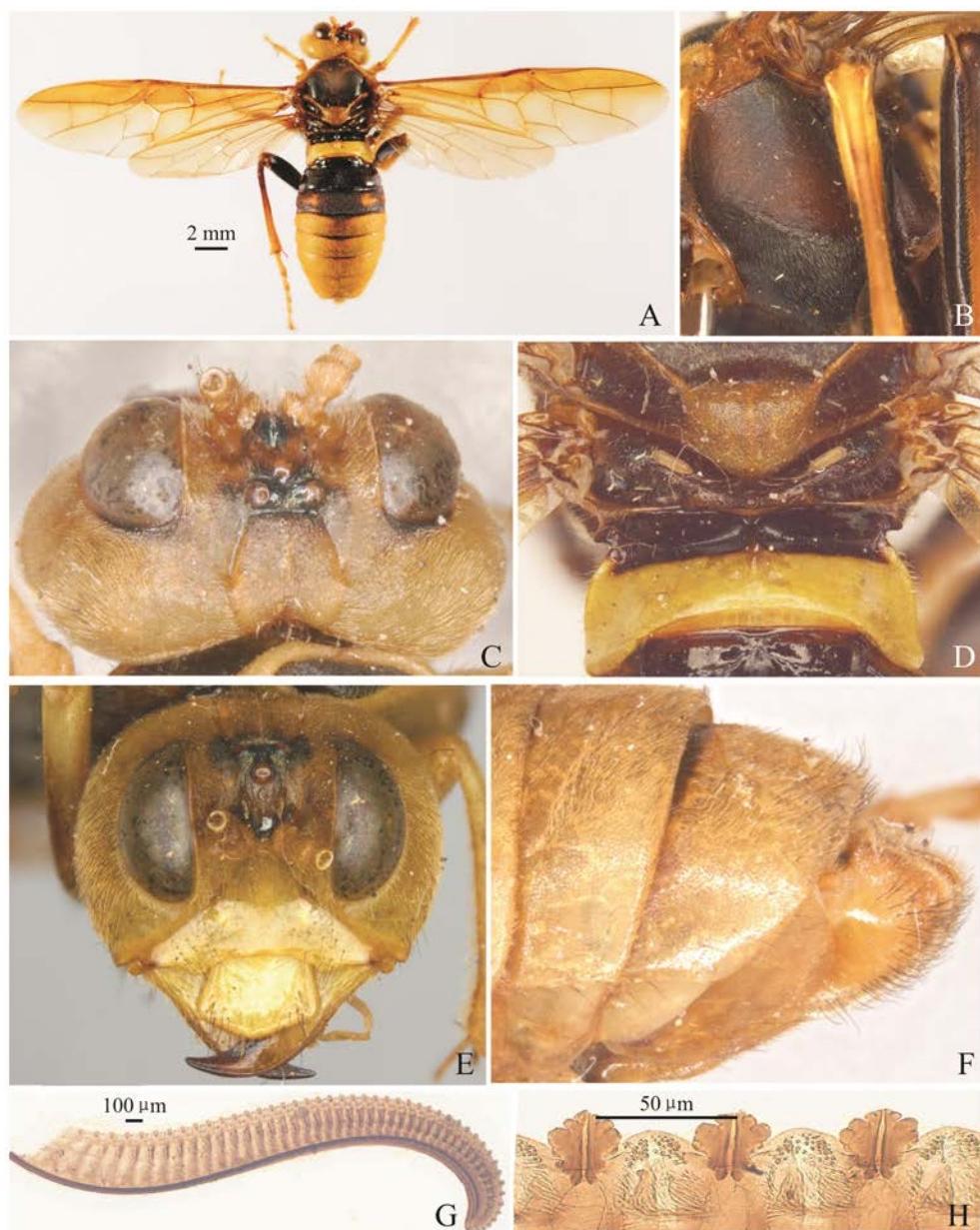


Figure 2. *Leptocimbex shennongjiaensis* Yan, Wei & Deng sp. nov. A. Adult female (holotype), dorsal view; B. Mesopleuron of female, lateral view; C. Head of female, dorsal view; D. Metanotum and base of abdomen; E. Head of male, frontal view; F. Apex of abdomen, lateral view; G. Lancet; H. Middle serrulae.

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